

The Denslow

STEAM

HEATING

&

VENTILATING

APPARATUS

MANF'D BY

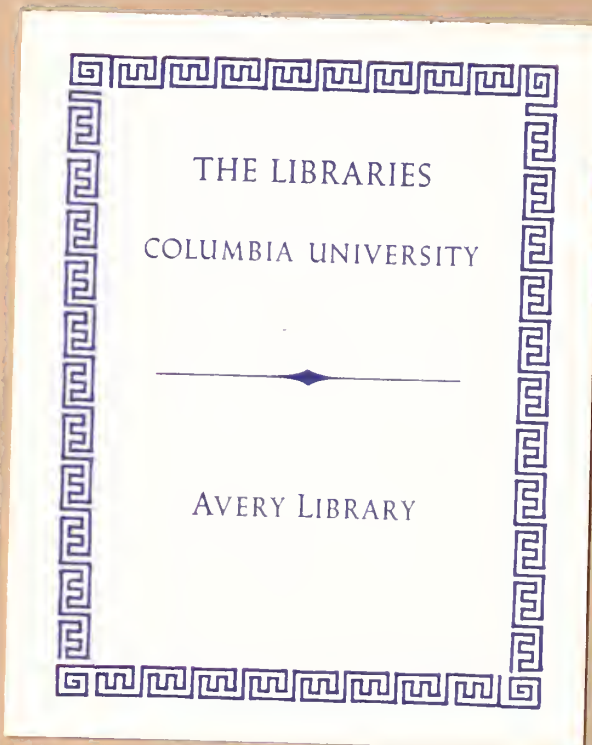
THE DENSLOW HEATER Co.

PHILADELPHIA, PA

7th. St.

No. 49
NORTH

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Bridges' Exchange
24 South 2nd St.

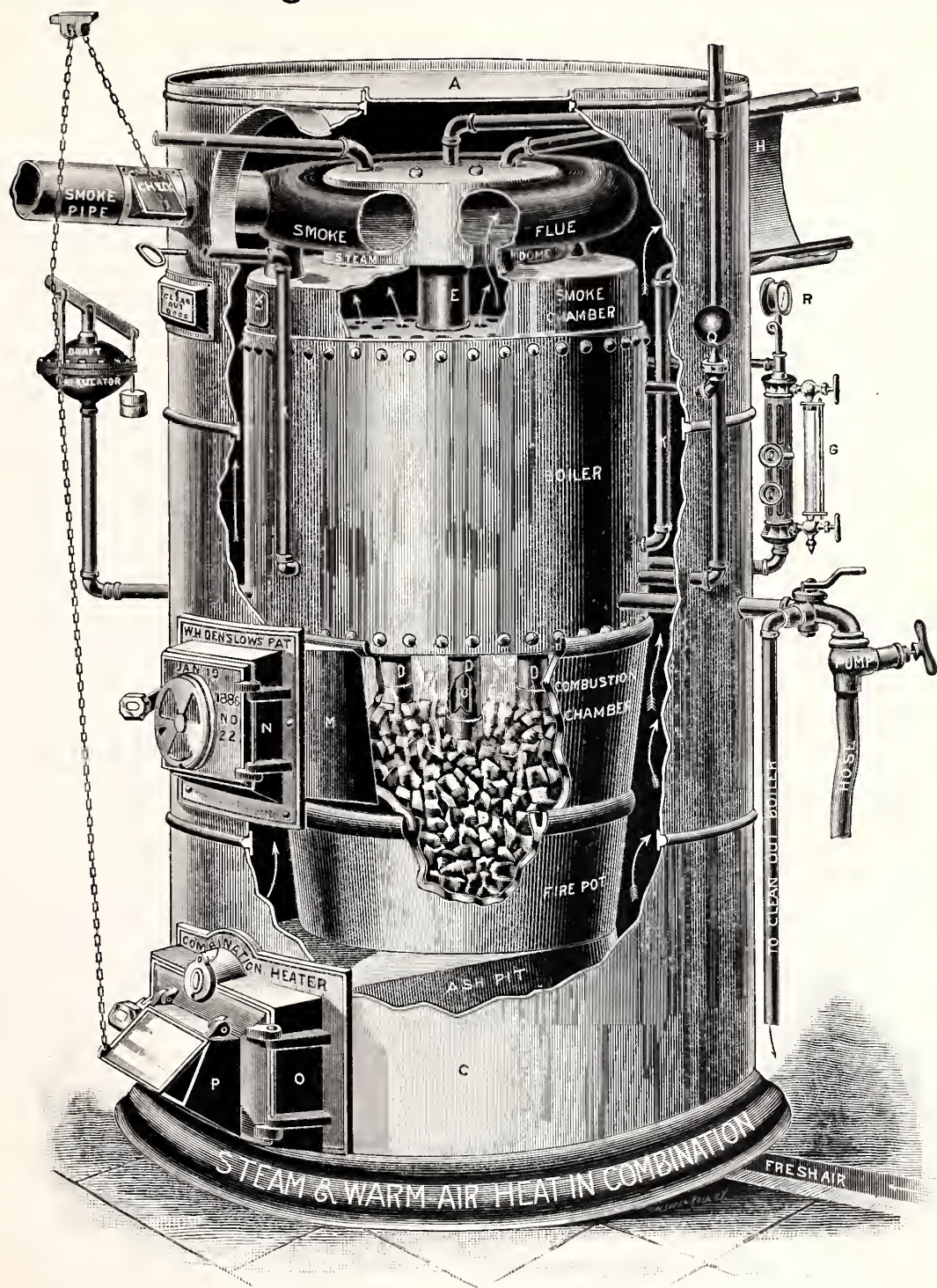


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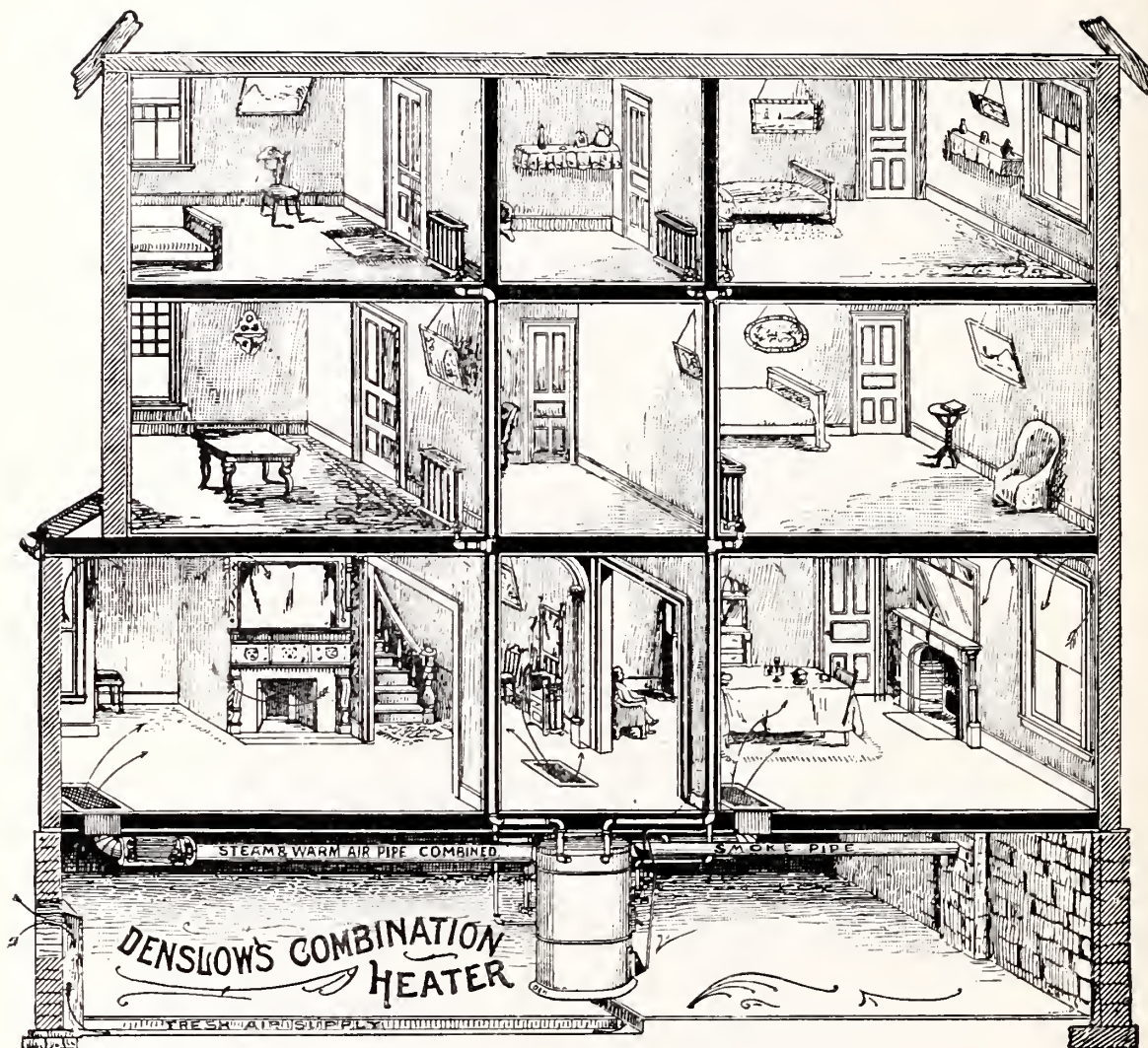
THE DENSLOW

Steam Heating and Ventilating Apparatus



MANUFACTURED AND SOLD BY

DENSLOW HEATER CO.
PHILADELPHIA PA.



THE ABOVE SECTIONAL CUT SHOWS A DWELLING
HEATED AND VENTILATED
BY THE DENSLOW HEATER.

Steam Heating and Ventilation.

THE problem which is exciting much attention at the present time in the science of warming buildings or dwellings is to attain a thorough diffusion of heat, at the same time keeping the economy of fuel and apparatus always in view.

In the ordinary heating apparatus of to-day it is customary to build a fire in some furnace or generator prepared for the purpose and to circulate the heat thus generated by means of atmospheric air, steam or water. The direct radiation from the generator or furnace is not taken into account as a rule, except in the case of hot-air furnaces. Hot-air furnaces are extremely objectionable, as they heat a small area of metal to an exceedingly high temperature. For this is necessary on account of the limited amount of heating surface which is used by hot air furnaces to heat a large amount of air. The results are that the air designed to heat a building is introduced into the building greatly de-vitalized and frequently charged with fine dust from ashes, to say nothing of carbonic acid gas and carbonic oxide which passes through this highly heated metal as easily as water through a sieve.

The objections to *direct systems of steam heating* are, *first*, that there

is no possibility of good ventilation where nothing but direct radiation is used, and, *secondly*, that all the direct radiation from the boiler is lost and cannot be utilized to heat the house or building in question. *Indirect steam heating* where radiators are placed below the floors and connected by flues and ducts, is a very extravagant means of accomplishing the end, as cold air is brought in direct contact with steam-heated metal, causing sudden condensation of steam and excessive contraction and expansion of the metal of the indirect radiator at all times, thus producing a severe strain upon the radiator and a costly demand upon the boiler.

With these facts well understood, and knowing the mistakes and unnecessary expenditures that have followed from the use of these imperfect systems of heating now in use, we beg leave to introduce the distinctive merits and superior advantages of the Denslow Heating and Ventilating Apparatus.

THE DENSLOW

Heating and Ventilating Apparatus.

The Denslow Heating and Ventilating Apparatus being a Combination Steam and Warm Air Heater has been perfected by careful study and much thought. The experience of a number of years has shown it to possess all the better features of steam heaters with none of their disadvantages, combining same with an ample pure air supply and utilizing the direct radiation from the heater which is lost in other systems. Economy, where it does not interfere with efficiency, is largely taken into consideration in this apparatus. The main reason for this is, *first*, that it utilizes all radiant heat ordinarily lost; *second*, it diffuses heat perfectly, quite unlike a furnace; *third*, it does not contaminate air as in the case with furnaces; *fourth*, has all the advantages and none of the disadvantages of steam or hot air.

To state the case briefly, Denslow's Heating and Ventilating Apparatus accomplishes the proper warming of the building in the following manner:

A boiler properly constructed, which we will explain in detail further on

is connected with a warm air heater in such a manner as to allow for the taking out of steam pipes from the boiler which run direct to direct radiators on the upper or distant rooms and floors to be heated.

The rooms nearer the heater are heated by warm air passing through flues and registers directly into the rooms in the vicinity, and in each of these warm air flues is placed an indirect radiator supplied with steam from the boiler which we have mentioned.

A cold air flue, from the outside, enters below the heater jacket and supplies the amount of fresh air needed at all times for ventilating purposes and as a medium to conduct the heat.

The direct radiators in the upper and distant floors receiving their heat from steam which circulates through them, causes a certain action of the air while rarifying it, and the fresh air passing through the jacket of the heater is drawn to upper and distant parts of the building to supply the slight tendency towards a vacuum caused by those direct radiators we have mentioned.

As we remarked before, wherever a furnace is used the temperature must be high on account of the small amount of radiating surface, and that the air is badly de-vitalized, while in the Denslow Heating and Ventilating Apparatus we have so much radiating surface, viz: the *steam radiators, both direct and indirect, the combustion chamber, fire pot, smoke chamber, flue, steam dome, boiler and steam pipes*, and inner side of warm air flues, that in order to heat the requisite number of cubic feet of air, it is subjected to a temperature at no time above 250 degrees Farenheit, except at such time as the fire is

first kindled in the heater, for it has been proven that metal heated to a temperature above 250 degrees is very detrimental to atmospheric air, if used for breathing purposes.

To sum up our claims for this heater, we wish to say that we supply the necessary amount of heat together with an ample amount of pure air for ventilation, and we can say boldly that our system is more economical on account, not only of utilizing the direct radiation of our heater, but because the direct radiators help and positively enforce the circulation of the heated air to the most remote parts of the building; and this result is not attained by any other system of heating known.

Another point which we cannot dwell too strongly upon is the placing of indirect radiators in the warm air-flues, for they accelerate and ensure a perfect flow of warm air at all times, and they are to be depended upon, no matter what the barometrical condition of the air may be. We claim that we have accomplished results with this combination heater which it would have been impossible to attain by any other heater or furnace manufactured.

On page 8 will be found an illustration of the Denslow Heating and Ventilating Apparatus. The heater is constructed in the best possible manner, provided with a rocking grate which can be seen in the illustration on page 7, having the fire-pot constructed with special reference to this combination-heater, of ample size to carry a considerable body of coal under slow combustion, which is the only proper way of running any heating apparatus.

Directly over the fire-pot is placed the boiler, constructed of mild steel, containing lap-welded tubes, extending entirely through the boiler and through which all the products of combustion and inflammable gases must pass, and utilizing a great deal of surface directly over the top of the fire-pot, as well as all the heat which passes through the flues to be absorbed and taken into the water contained in the boiler.

Directly over the boiler proper, and connected to same by means of a 4-inch pipe, is a super-heating dome, into which the steam passes immediately from the boiler and which arrests and absorbs into the steam such residue heat from the fire as may have passed through the boiler.

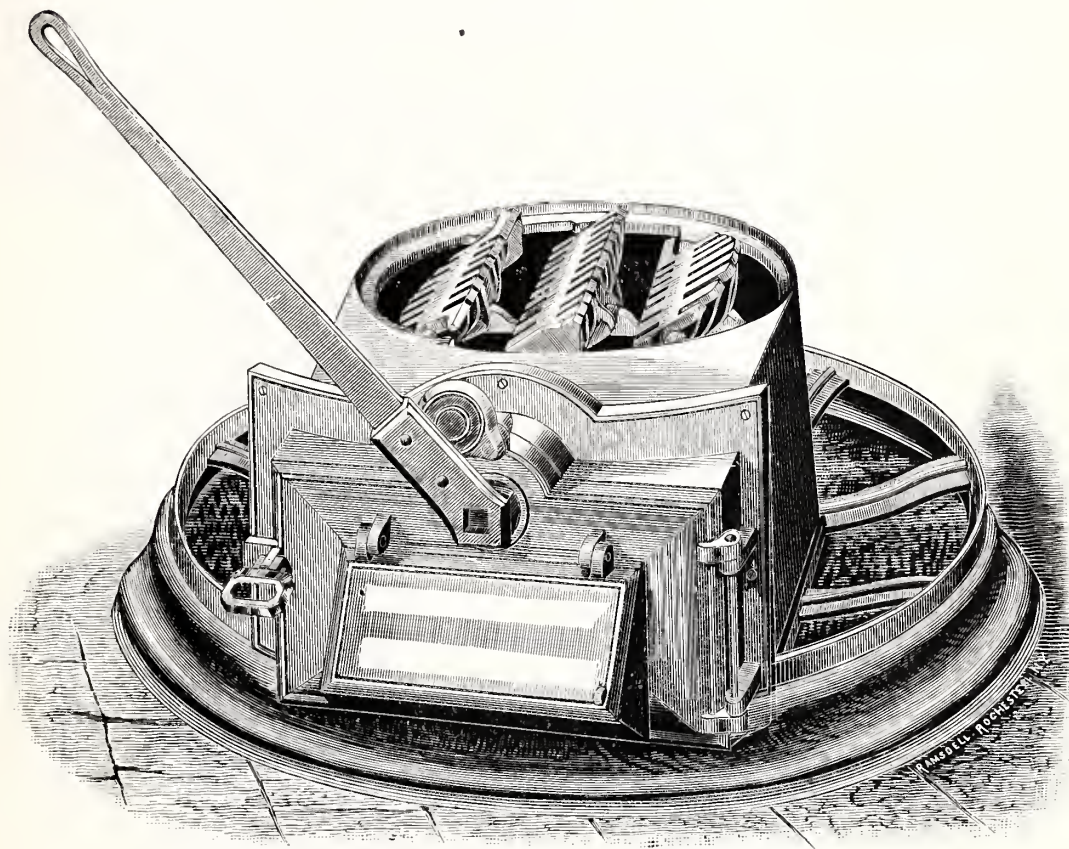
The smoke flue runs entirely around this super-heating dome so that the products of combustion do not escape from the boiler into the smoke flue until they have had a chance to come thoroughly in contact with the water or steam which is designed for circulation through the radiators, both direct and indirect which are used in this system of heating.

All steam pipes designed to feed the radiators mentioned are taken from the top of this super-heating chamber or dome and the steam which enters the radiators on account of its being super-heated, is very dry and at a high temperature.

The return pipes from the radiators are brought back to the lower part of this boiler and the condensation returns by gravity and no trap or pump is used.

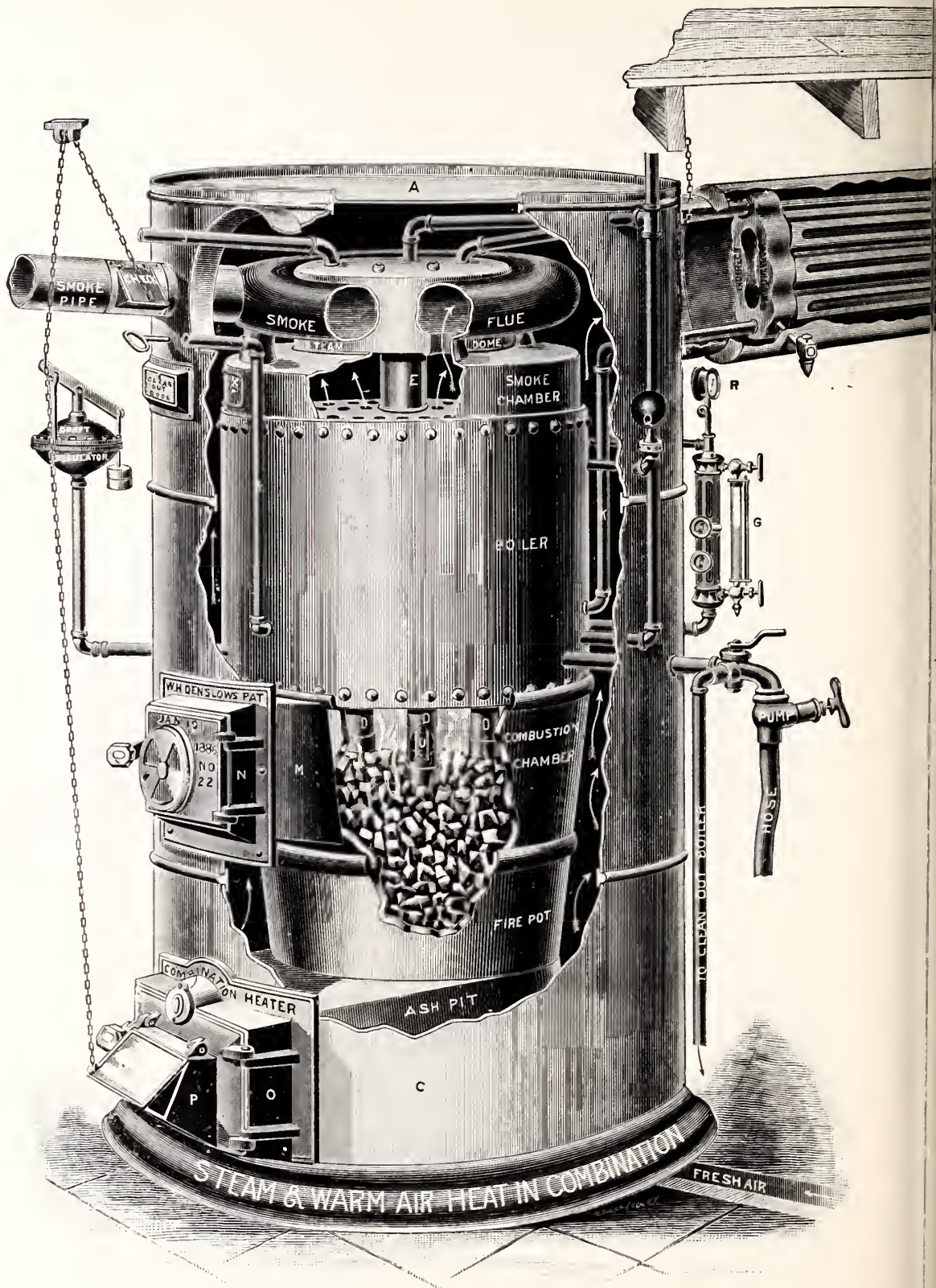
At the lower part of this combination boiler and heater a fresh-air duct leading directly from out of doors supplies pure air, which is drawn into the

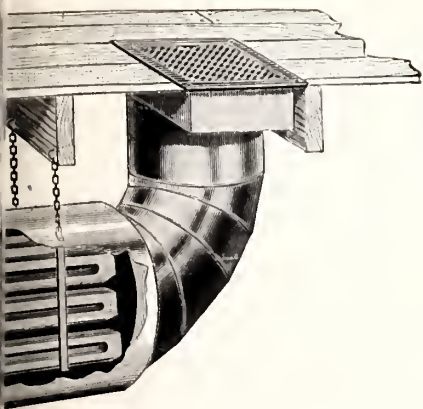
jacket of the heater and into contact with the heat from the fire-pot, combustion chamber, boiler, smoke chamber, smoke flue and steam-dome, before it is allowed to pass into the air-flue and introduced into the dwelling to be heated.



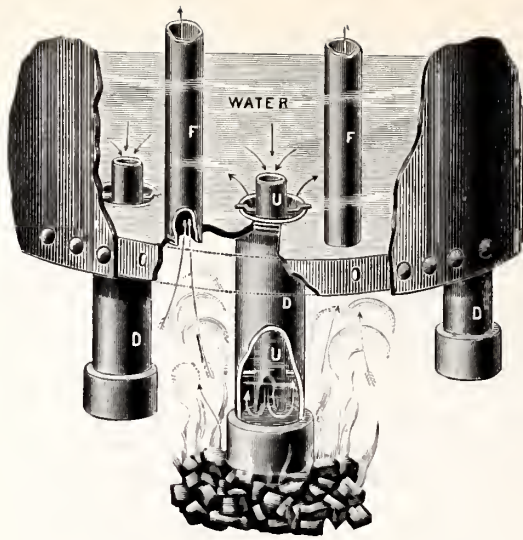
GRATE AND ASH PIT OF DENSLOW COMBINATION HEATER.

The grate is shaken by means of a long lever and it is not necessary for one to stoop in order to thoroughly clean the fire of ashes. This is an advantage which will be appreciated by all who have ever undertaken to use the old-fashioned shaker. Strongest and heaviest grate on the market, has no cog-wheels or bolts to get out of order. Can be replaced without taking down heater.

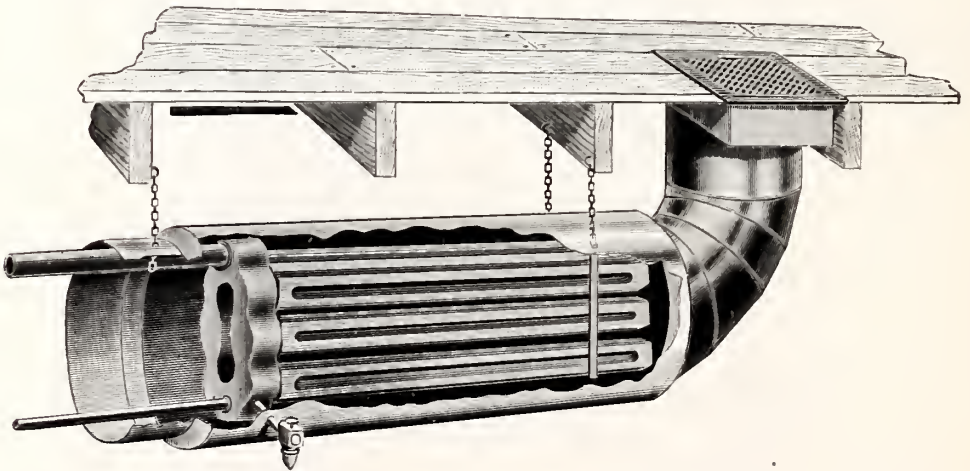




The double-page cut here shown represents the Denslow Heating and Ventilating Apparatus with an indirect steam radiator in a warm air flue. This combination of *Steam and Warm Air* is original and found only in the Denslow Heater, and insures a positive circulation of air in all warm air flues leading to the floors of the house to be warmed.



The boiler is also supplied when required with a number of drop tubes which are brought into direct contact with the burning fuel and supplied with diaphragms insuring absolute circulation and greatly increasing the efficiency and capacity of the boiler, as the flues can be made to contain a large amount of heating surface, and this surface is more valuable than any other in the apparatus.



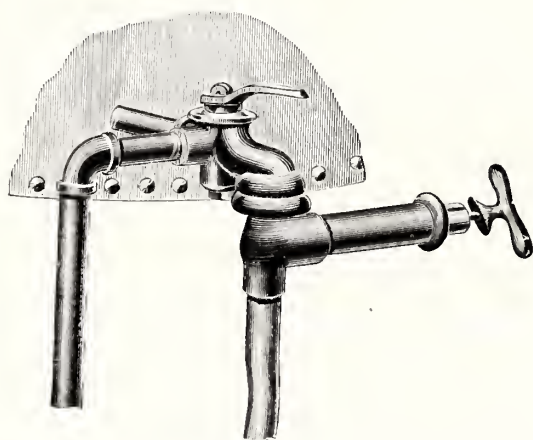
The warm-air flues at the top of the boiler are reinforced by an indirect radiator placed in an enlargement of this hot-air flue.

The fire-pot, which is made of the best quality of iron, is cast over one inch thick and the combustion chamber is set in same in a socket joint or groove, and cemented by asbestos cement.

The boiler is set on the top of the combustion chamber in a like manner, its flanges extending into the socket of the combustion chamber and likewise cemented.

Their joints are made in a like manner and are constructed with a view to absolutely prevent the escape into the fresh air supply of any of the gases of combustion.

An examination of our illustration on pages 8 and 9 will show many of these points which we have described. We particularly call your attention to the illustration on second page of cover containing a sectional view of a house with a heater, warm air pipes, indirect radiators, warm air registers and ventilating registers, direct radiators, etc., showing our system in operation. The action of the heated air is shown and how it is diffused throughout the house, as is also shown the system of circulation and the arrangement of the steam supply pipes for the radiators, as shown in the illustration on page 11. It will be noticed that the pipe or flue is made much larger in order to accommodate this radiator and still allow an ample flow of air into the apartments to be heated. It will be readily understood that the heat of this flue by means of this indirect radiator and its connections largely accelerates the flow of air into the apartments to be heated.



Above will be seen a very simple pump for feeding this boiler with water, and this is an important feature which should not be overlooked, especially in localities that are not supplied with water works.

All the usual dampers and cleaning doors are supplied with this heater, as well as the automatic draft regulator, which, it can be readily understood, regulates not only the steam supply but the hot-air supply as well, a feature unknown in furnaces.

The construction of this apparatus is such that it is impossible for the ordinary products of combustion or gases which we have mentioned to come in contact with the fresh air supply, as the fire-pot and ash-pit are entirely isolated from the air supply.

To sum up, we claim the following advantages for the Denslow Apparatus and have endeavored to make our language in this description as simple as possible, so that any one, even if he be not familiar with any of the systems of steam or warm-air heating, can comprehend the various details of this apparatus. We are prepared with many of the strongest letters of recommendation, and on the next page will be found extracts from numerous people who have used this heater, giving their ideas as to its merits; and we believe that these letters will corroborate each and every claim which we have made in this circular.

Economy. Thorough Distribution of Heat.

Ample Fresh Air Supply.

Economy of Cost of Construction.

**Utilization of the Greatest Possible Number of Units of
Heat from each Pound of Coal.**

Great Efficiency.

Great Simplicity.

Ease of Manipulation, and many other features.

We have endeavored to give a careful description of this apparatus in detail with illustrations showing the different parts mentioned, and all other information interesting and necessary to those who desire to investigate or purchase the most perfect heat producer now on the market.

THE HEATING AND VENTILATION OF SCHOOL HOUSES.

It is a very surprising fact that, although schools and academies as a rule are heated well enough, that, nine times out of ten very little attention is paid to ventilation.

In some schools where lectures or recitations on Hygiene, Chemistry or Natural Philosophy are taking place, and scholars are being informed that impure air when inhaled produces impure blood, sluggish circulation, headaches, and general debility; that carbonic acid gas, when produced by exhalations from lungs or bodies, is extremely hurtful to the general health and eyesight; that carbonic oxide is a deadly poison even in minute quantities; also that it is a mechanical possibility to furnish each and every individual in a school room with a sufficient amount of *pure* air at the proper temperature for breathing purposes.

While all these facts are being stated the scholars and teachers are in all probability breathing air so foul and impure that it is surprising that they have vitality enough left to comprehend what is taught them.

The latest dictum from scientific authorities is that an adult requires from 2000 to 2500 feet of fresh air per hour for breathing purposes; that school children should have on an average at least 1500 cubic feet of pure air per hour, and that when a less amount is furnished bad results as mentioned are bound to ensue. On this all doctors are agreed, and oculists state that one of the prime causes of early failure of eyesight and astigmatism is impure air found in badly ventilated school rooms.

Superintendents of schools and teachers are frequently aware of the terrible condition of their schools and try to remedy it by opening windows or doors. This never fails to produce draughts and there is an inevitable inrush of cold air which settles to the floor, and scholars and teachers alike must suffer with cold feet or breathe foul air.

School Boards are frequently indifferent on this subject, but were they obliged to spend a week at school subjected to the discomforts and dangers of a poorly heated and ventilated school room, they would be very zealous in their efforts to remedy this crying evil.

The Denslow Heating and Ventilating Apparatus is peculiarly adapted to the heating and thorough diffusion of warmed air in schools in sufficient quantity to supply each scholar and teacher with from 1500 to 2500 cubic feet of warm, fresh air per hour; this with all windows and doors closed and no draughts produced.

It may be argued that this result can be accomplished only by an extravagant use of fuel, but this is a mistake, as our apparatus is so constructed as to utilize each pound of coal burned to the best possible advantage, and we are prepared to demonstrate these facts to those who are interested.

We shall be glad to furnish estimates for a perfect system of heating and ventilation of schools and academies, based on a thorough knowledge of the subject, supplying plans, specifications, and apparatus, and the work of construction can be done under our supervision by any steam heating contractor that may be decided upon.

TESTIMONIALS.

EFFICIENCY.

TOWANDA, PA., April 2, 1890.

GEO. C. JACKSON, ESQ.

Dear Sir:—I have noticed with considerable interest, the workings of the two large heaters placed in our high school building by Denslow & Jackson, in the fall of 1888.

I consider them successful, for they do more and better work than four hot-air furnaces previously in use, while the ease in management and saving of fuel are much in their favor.

I have no hesitancy in commending the "Denslow" heater as a decided advance in the work of steam heating.

Yours truly,

JAMES H. CODDING, Secretary.

ECONOMY.

TOWANDA, PA., March 28, 1890.

GEO. C. JACKSON, ESQ.

Dear Sir:—After using the Denslow Heater in our large church and presbytery for three years, I am more than satisfied in every respect. It is easily attended to, *burns but little coal*, and gives all the heat required in the very coldest weather.

Yours truly,

CHARLES F. KELLY, D. D.,

Rector Churches of SS. Peter and Paul.

SIMPLICITY.

I regard it as the simplest and most efficient heater I have seen. It has given perfect satisfaction ever since it was put in.

J. H. GREEN, M. D.,

February 25, 1890.

Dubuque, Iowa.

ENTIRE SATISFACTION.

It gives good satisfaction and I have no hesitation in saying it is the best heater I have any knowledge of.

RUSH J. THOMSON,

March 28, 1890.

Atty. at Law, Dushore, Pa.

It goes beyond our expectations.

W. N. REYNOLDS,

October 16, 1890.

Propr. Packer House, Tunkhannock, Pa.

It is a great comfort to us. No gas, dust or burnt air from the heater to breath. Ventilation is grand.

G. S. SMITH,

February 25, 1890.

Towanda, Pa.

GOOD VENTILATION.

The heat is pure and *ventilation perfect*, is *very economical* in fuel. The longer we use it the better we like it.

STANLEY W. LITTLE,

February 21, 1890.

Atty. at Law, Towanda, Pa.

UNIFORMITY OF HEAT.

Gives uniform heat throughout the house during the coldest weather. No *hammering* or *pounding* in radiators or pipes. Has proven itself a grand success.

IRVING R. SCHOONMAKER, M. D.,

March 1, 1890.

Sayre, Pa.

SELF-REGULATING.

We are very much pleased with it, is *self-regulating*, takes but little fuel, no dust or gas from the heater, requires but a pail of water once in two weeks. Ventilation is perfect.

C. C. MILLER,

March 4, 1890.

Towanda, Pa.

MORE THAN FULFILLS EXPECTATIONS.

Does more than you claimed for it. I am perfectly satisfied with its heating qualities and would not do without it for twice the amount it cost me. I cheerfully recommend it.

D. W. STARK,

October 15, 1889.

Tunkhannock, Pa.

It does all it was recommended to do and I am not disappointed in it in any respect, am well pleased with it.

JOHN A. SITTSER,

October 15, 1889.

President Judge 44th Judicial Dist., Tunkhannock Pa.

COMBINING HEATING AND VENTILATION.

The quality of the heat, combining indirect heat and pure warm air, is a grand feature of this heater, in a sanitary point of view. Is like a pleasant summer heat, at all times pure and delightful. I have found the heater very economical and easily managed, regulating itself.

J. J. GRIFFITH,

February 12, 1890.

President Towanda Water Works Co.

CLEANLY.

There is no dust or gas from it, is easily managed, requires but little attention, and to say we are pleased is putting it mildly.

J. A. DECKER,

April 1, 1890.

of Decker Bros., Towanda, Pa.

A partial list of those using the Denslow Combination Heater:

Rev. C. F. Kelley, . . .	Towanda, Pa.	Catholic Church, . . .	Sayre, Pa.
Church SS. Peter and Paul,	Towanda, Pa.	Rev. John Costello, . . .	Athens, Pa.
Christ Church, ...	Towanda, Pa.	W. D. G. Cottrell, . . .	Clarence, Iowa.
Mercur Block, ...	Towanda, Pa.	P. F. Dalton, ...	Le Mars, Iowa.
J. J. Griffith, ...	Supt. Towanda Water Wks. Co., Towanda, Pa.	E. A. Mills, ...	U. P. R. R., Omaha, Nebraska.
Stanley W. Little, . . .	Attorney at Law, Towanda, Pa.	P. C. Gori, ...	Sheshequin, Pa.
B. T. Hale, ...	Towanda, Pa.	Dr. E. S. Wheeler, . . .	Nicholson, Pa.
G. S. Smith, ...	Towanda, Pa.	J. W. Stroud, ...	Blackwalnut, Pa.
W. H. Dodge, ...	Towanda, Pa.	B. Congor, ...	Groton, N. Y.
High School, ...	Towanda, Pa.	W. Williams, ...	Groton, N. Y.
George Decker, ...	Towanda, Pa.	A. A. Burrows, ...	Stevensville, Pa.
J. A. Decker, ...	Towanda, Pa.	Second National Bank, .	Cooperstown, N. Y.
H. L. Scott, ...	Towanda, Pa.	H. Brant, ...	Owego, N. Y.
Clark B. Porter, ...	Towanda, Pa.	Ahwaga House, ...	Owego, N. Y.
R. H. Lanning, ...	Wysox, Pa.	E. F. Fowler, ...	Monroeton, Pa.
Hon. John. A. Sittser, P. J.,	Tunkhannock, Pa.	Dr. J. H. Greene, . . .	Dubuque, Iowa.
Hon. Paul Billings, . . .	Tunkhannock, Pa.	Bank of Lansing, . . .	Lansing, Iowa.
M. E. Church, ...	Tunkhannock, Pa.	J. W. Thomas, ...	Lansing, Iowa.
Packer House, ...	Tunkhannock, Pa.	Ludwig's Hotel, ...	Winona, Minn.
Hon. Palmer Jenkins, . . .	Tunkhannock, Pa.	High School, ...	Dushore, Pa.
D. W. Stark, ...	Tunkhannock, Pa.	Catholic Church, ...	Dushore, Pa.
School Building, ...	Ulster, Pa.	Convent, ...	Dushore, Pa.
R. M. Badger, ...	Train Master, L. V. R. R. Co., Sayre, Pa.	Hotel Carroll, ...	Dushore, Pa.
I. P. Bennett, ...	Waverly, N. Y.	Rush J. Thomson, . . .	Attorney at Law, Dushore, Pa.
J. K. Williams, ...	Sayre, Pa.	J. Monroe Ayres, . . .	Towanda, Pa.
Geo. Kere, ...	Boss Pattern Maker, Sayre, Pa.	M. E. Church, ...	Sayre, Pa.

